



# Potential Implications to California of Mexican Energy Reform

CEC Natural Gas Stakeholder Working Group  
April 16, 2014

# Cautionary Language

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# Discussion Outline

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- North American Macro Trends
- Impetus of Mexico's Energy Reform
- California and Desert SW Trends
- Summary of Key Takeaways

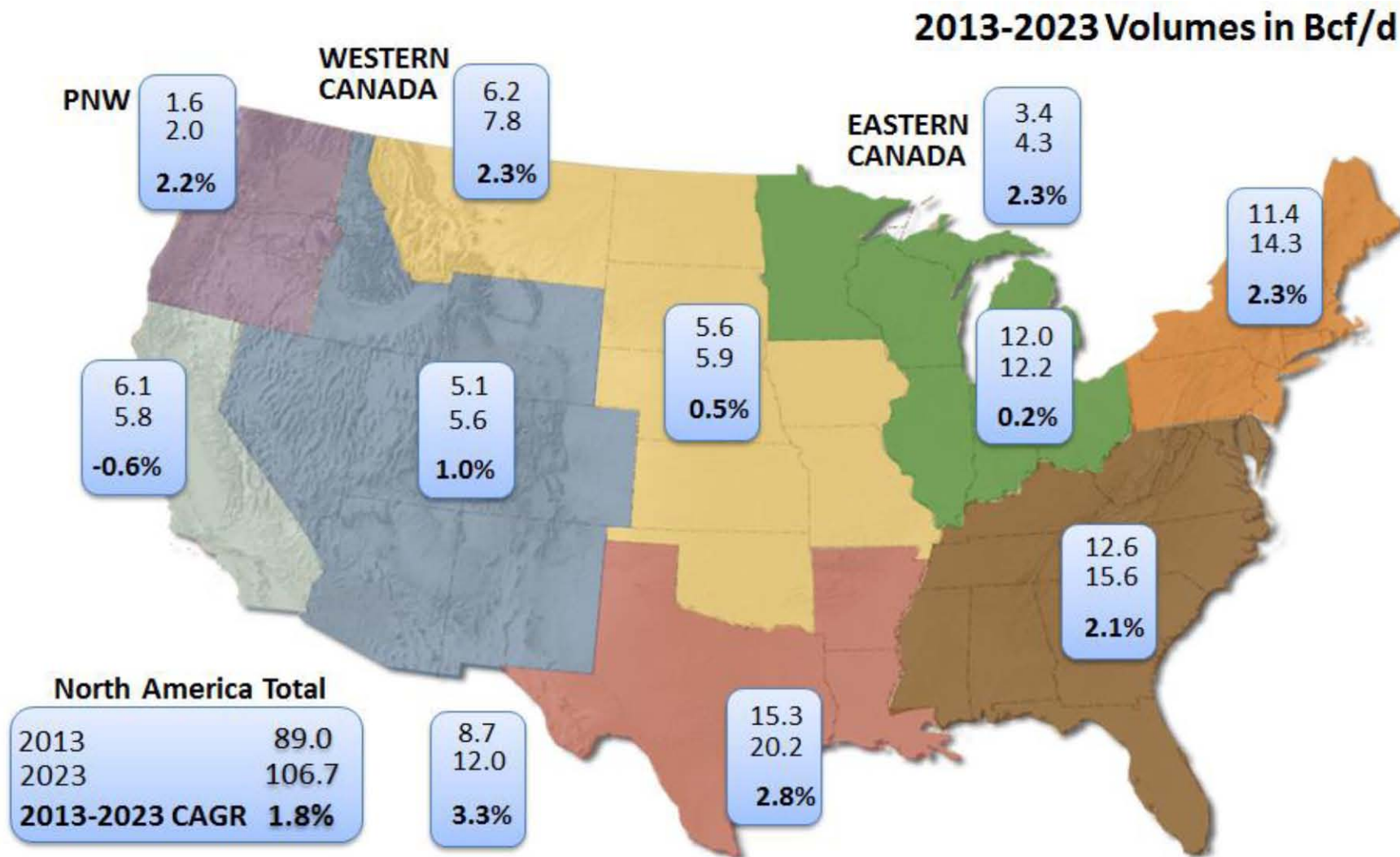
# North American Macro Trends

# Overview of Natural Gas Trends (2013–2023)

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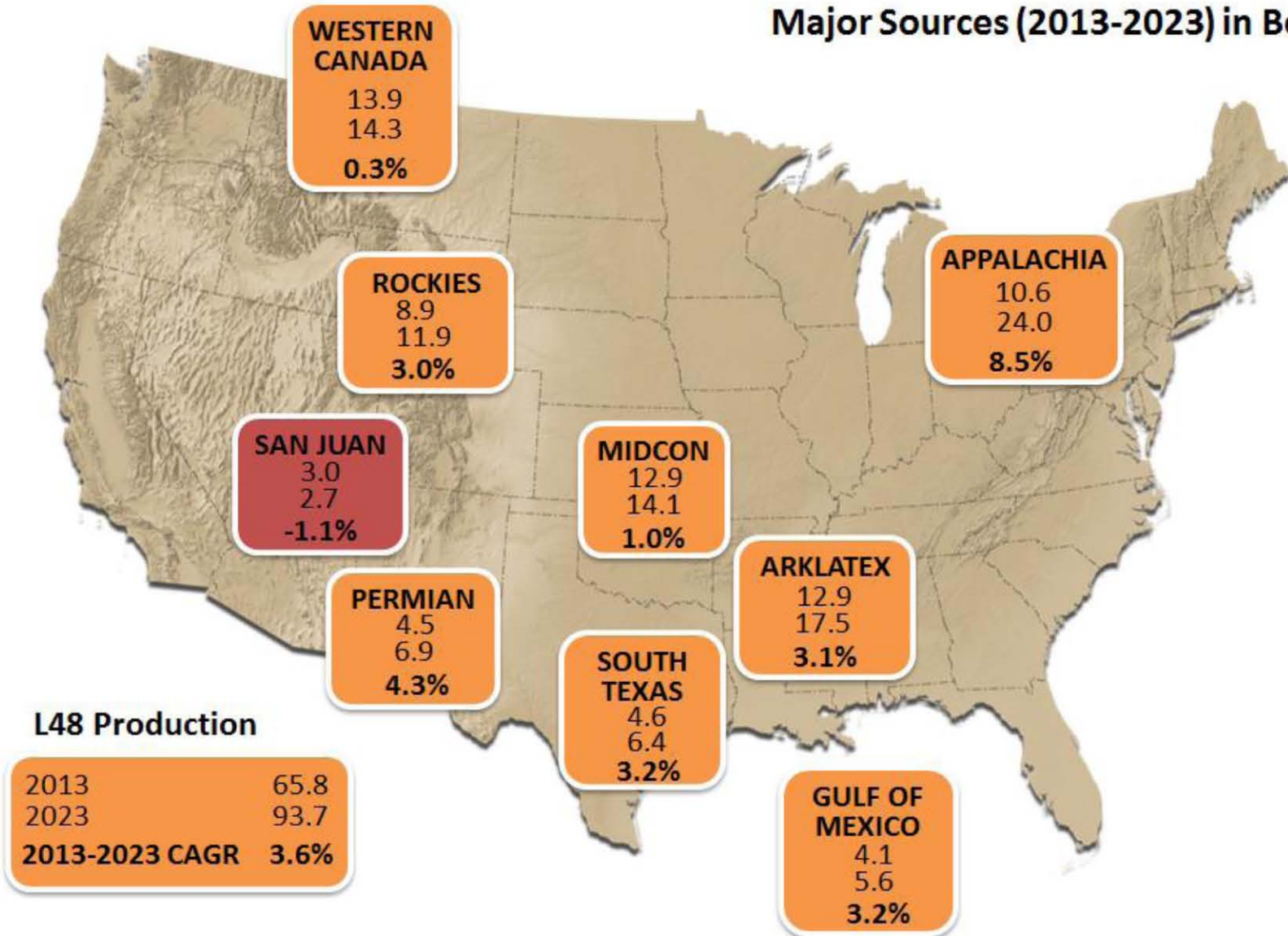
- LNG Exports and Industrial growth are key drivers of U.S. natural gas demand over the next 10 years, together accounting for over 86% of demand growth, with power gen making up the balance.
- Shale gas production will be the dominant influence of incremental supply growth, but it will also yield stable and lower gas prices
  - Unprecedented gains in Northeast production; West production declining but expect gains in the Rockies in the later half of this forecast.
  - The general market consensus suggests gas prices will remain around \$4 but will rise slightly above \$5 by the end of the decade
- North America expected to be a net gas exporter in less than 10 years:
  - 2.8 Bcfd British Columbia LNG Exports
  - 6.1 Bcfd Gulf Coast LNG Exports
- United States gas Import/Export Balance changing dramatically
  - **12.4 Bcfd** change in U.S. Import/Export Balance by 2022
    - 2.6 Bcfd more Mexico exports, 3.7 Bcfd fewer Canadian imports, 6.1 more LNG exports
    - Current net imports are 4.7 Bcfd (+5.5 Canada, +0.6 LNG, -1.4 Mexico)

# Gas Demand



# Supply

## Major Sources (2013-2023) in Bcf/d

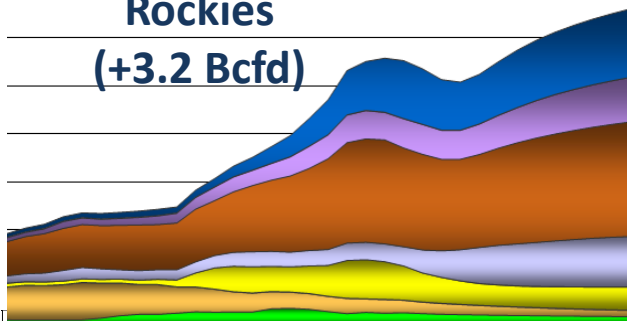




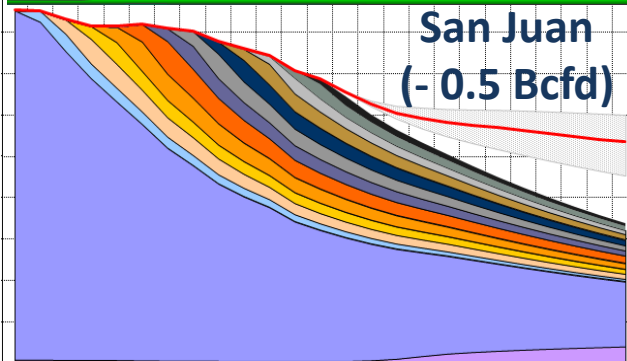
# Regional Production Forecast

Overall production forecasted to increase in the Desert Southwest Region

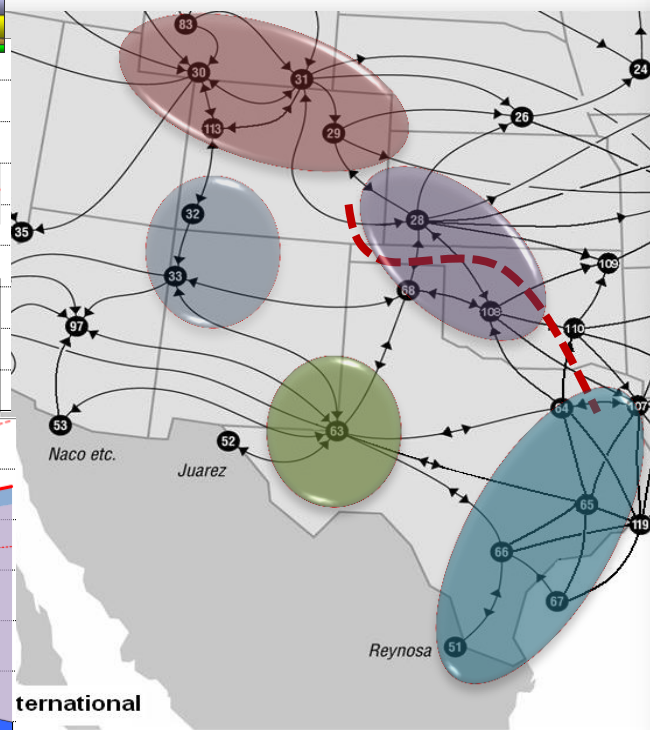
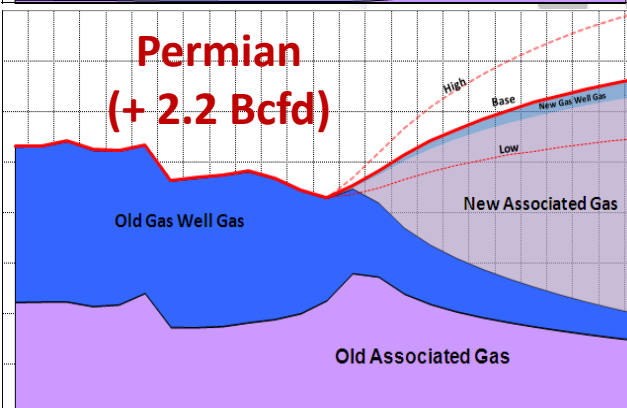
**Rockies**  
(+3.2 Bcfd)



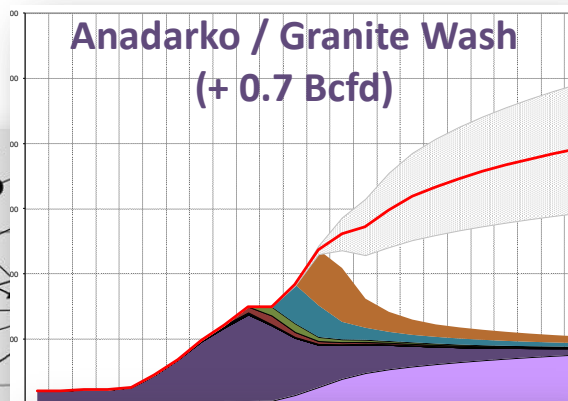
**San Juan**  
(- 0.5 Bcfd)



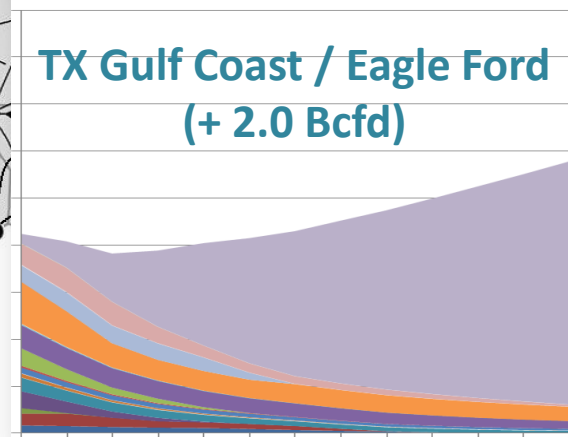
**Permian**  
(+ 2.2 Bcfd)



**Anadarko / Granite Wash**  
(+ 0.7 Bcfd)



**TX Gulf Coast / Eagle Ford**  
(+ 2.0 Bcfd)

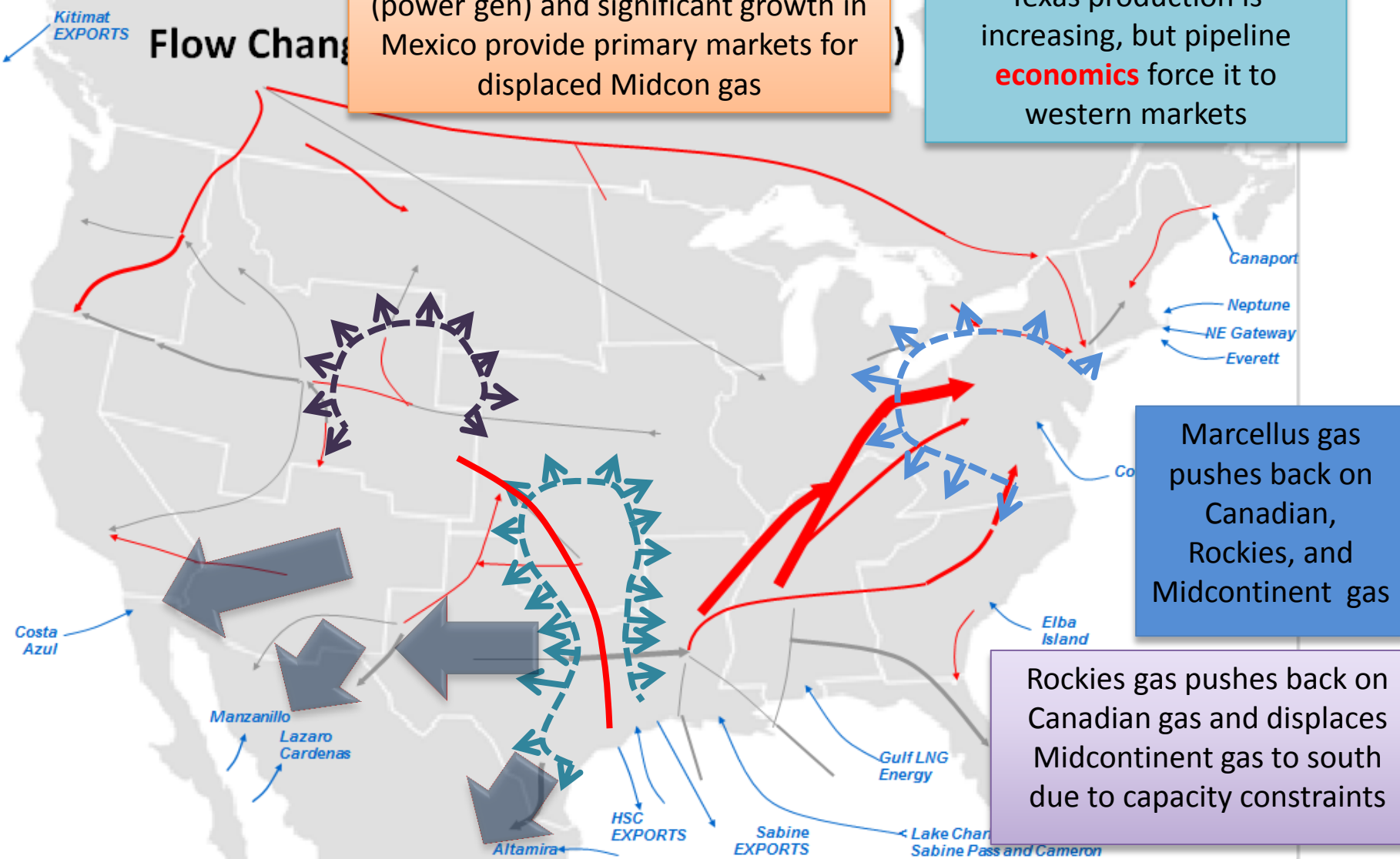




# Forecasted Changes in Flows (2013 vs. 2023)

Declining San Juan Basin production, modest growth in desert southwest (power gen) and significant growth in Mexico provide primary markets for displaced Midcon gas

Midcontinent and South Texas production is increasing, but pipeline **economics** force it to western markets



# Impetus for Mexico's Energy Reform

# Mexico Energy Reform

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- **Mexico's current legal framework, governing E&P, allows private participation through service contracts only and not by production-shared agreements, thereby limiting private sector investment incentives.**
- **Energy reform is required to:**
  - Incentivize private investment in gas exploration and production
  - Strengthen PEMEX financial capacity by reducing its fiscal burden
- **The new fiscal regime for PEMEX should start in 2015.**

# Mexican Energy Reform

## Indicative Timeline

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**Article 27 of the Mexican Constitution: *“In the case of petroleum, and solid, and liquid, or gaseous hydrocarbons no concessions or contracts will be granted.”***

Constitutional  
Revision  
(Dec 20, 2013)

Secondary  
Legislation  
(May 1, 2014)

Formation of  
Regulatory  
Bodies  
(2015)

Implementation  
and Bidding  
(?)

Foreign equity partners will be required to pay Mexico's corporate tax rate (30% + 10% on dividends), plus a currently undefined royalty, plus a surface “rental fee”.

Mexico's Finance Minister, Luis Videgaray, indicated “profit sharing” with foreign producers should include greater than 50% of the share going to Mexico. Decline in government revenues from Pemex will be offset by a mandatory dividend paid by PEMEX to Mexico.

All products must be turned over to a state-run sales agency; foreign producers will not be permitted to market the products they produce.

# Why Mexico needs energy reform?

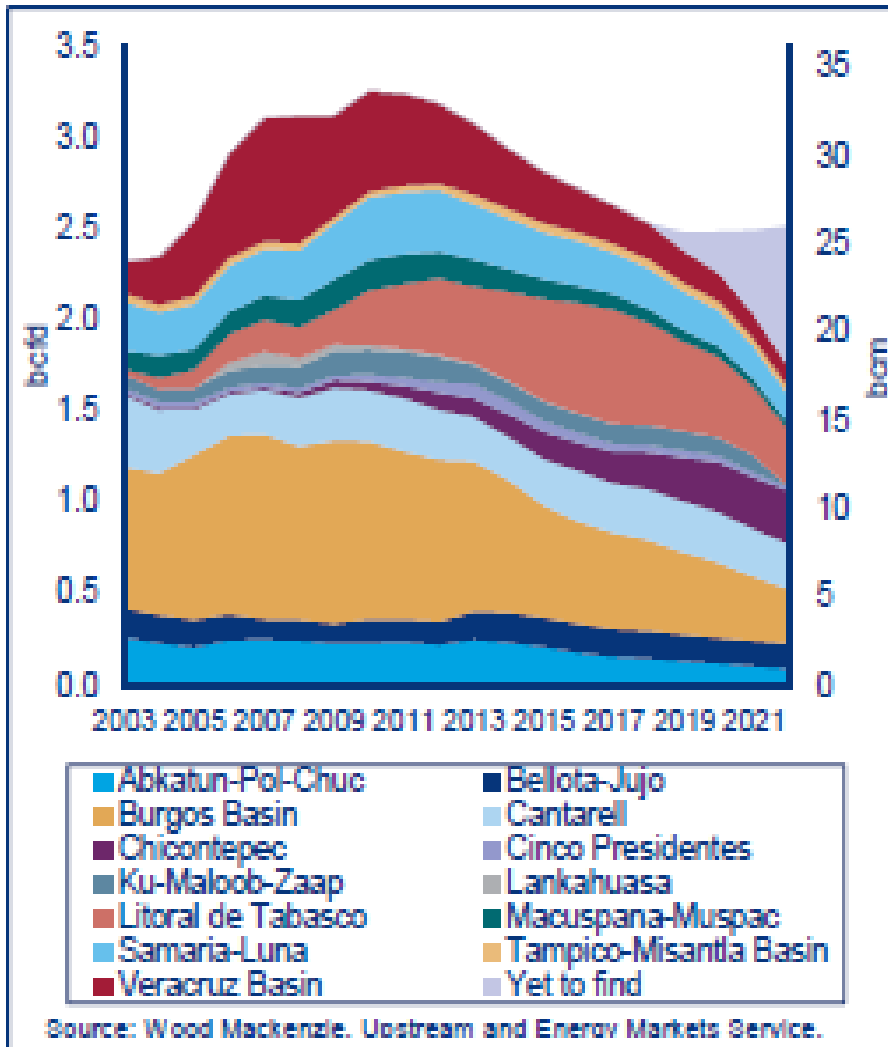
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**Pretty simple ...**

- **High fiscal dependence on oil revenues**
  - Revenues from oil is 34% of public budget
- **Declining Oil and Gas production**
- **Unsustainability of PEMEX/CFE finances**
  - Unconventional challenges exacerbate financial resources due to availability of human, technical, and execution experience due to size and complexity of unconventional projects

# Mexico Natural Gas Market

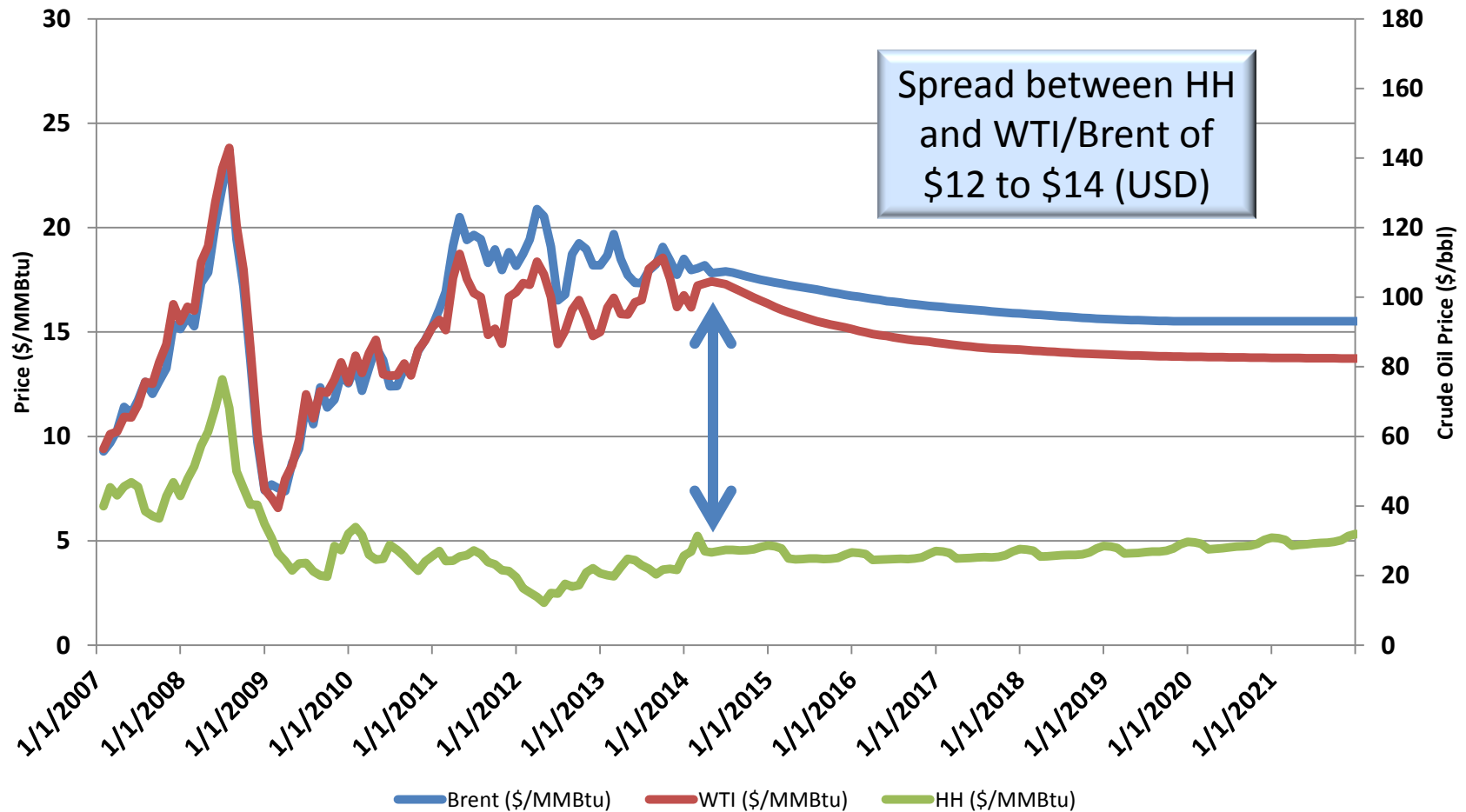
Dry Gas Production



- **Gas production is not a priority for PEMEX,** as the public budget remains linked to oil exports and investment capital points to oil E&P activities.
- Natural Gas Production will decline until 2019; however, more importantly, **only 60% of gas production reaches the market**
  - Gas is re-injected to maintain oil reservoir pressure
  - PEMEX consumption in upstream field operations
  - Flared gas

# U.S. Gas beats Oil and LNG

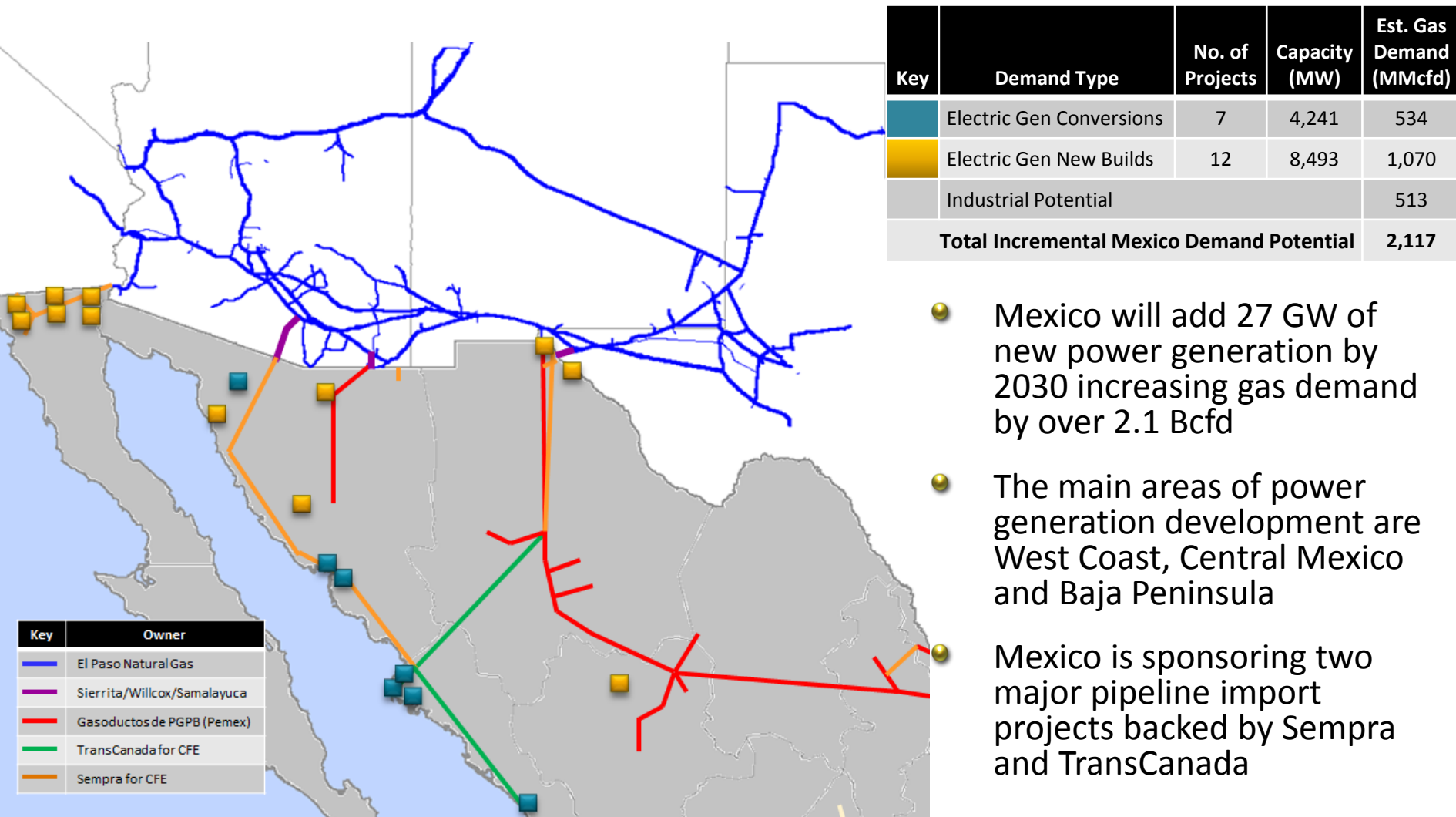
**Gas-to-Oil Ratio**  
(Historical Prompt & Forward Prices)



Source: Kiodex forward curves for March 11, 2014.

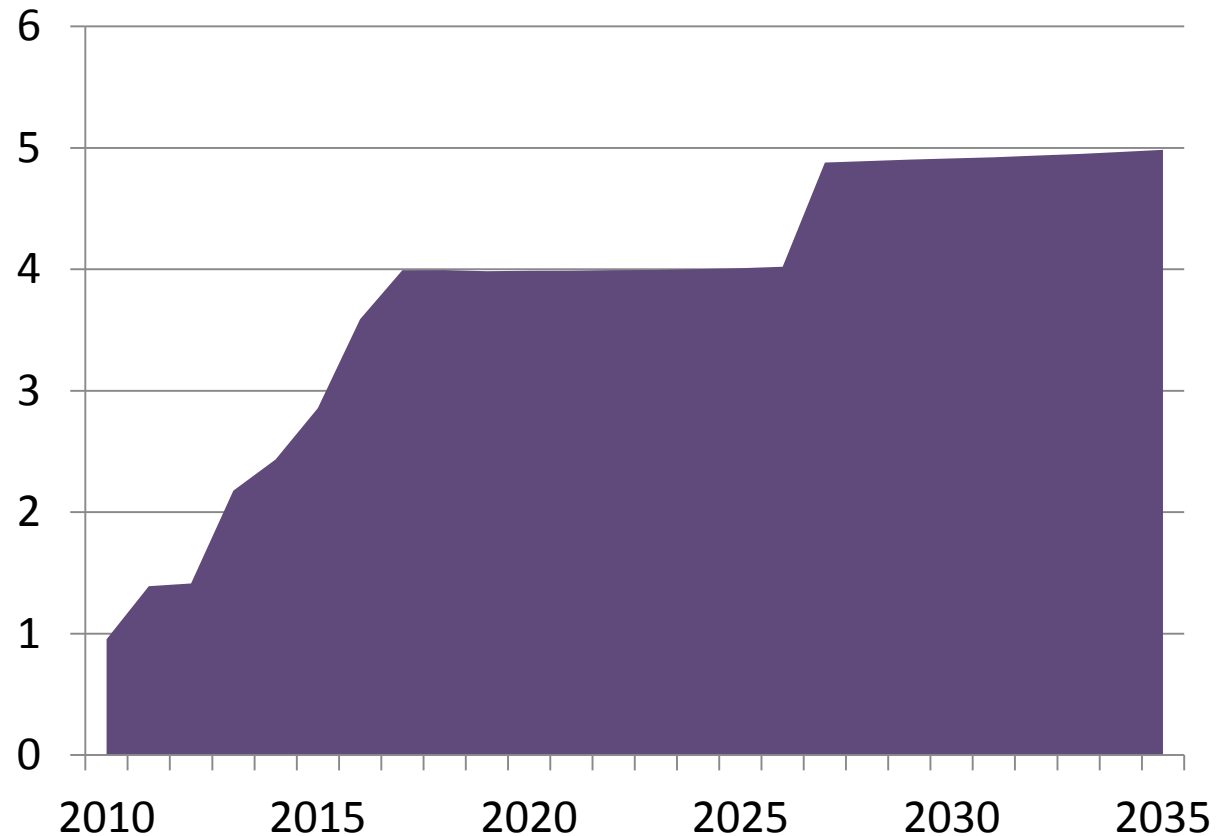


# Mexico's Infrastructure Build-out



# Exports to Mexico Increases to 5 Bcfd by 2028

**US Exports to Mexico**  
**Average Bcfd**



Pipeline expansions include planned laterals to Mexican power plants by Kinder Morgan in Arizona and West Texas and a new NET Midstream pipeline out of Eagle Ford.

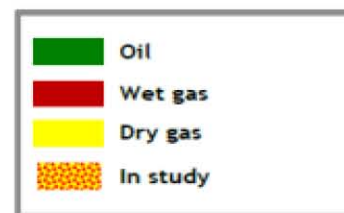
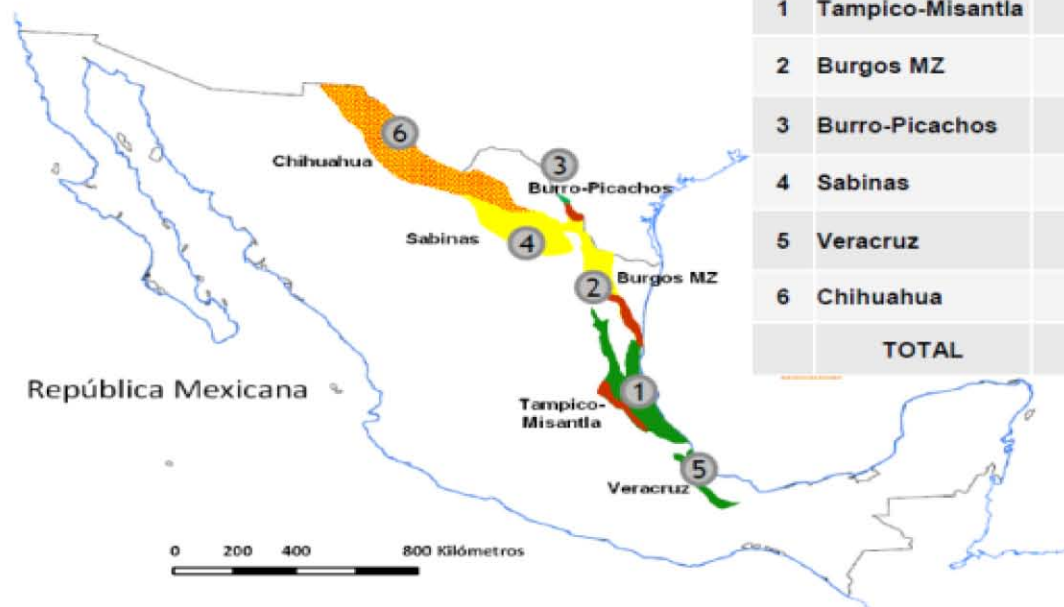
# Mexico Shale Gas Potential



As a result of geophysical, geological and geochemical studies, PEP has estimated an important amount of prospective resources of Shale Oil/Gas

Prioritization of areas

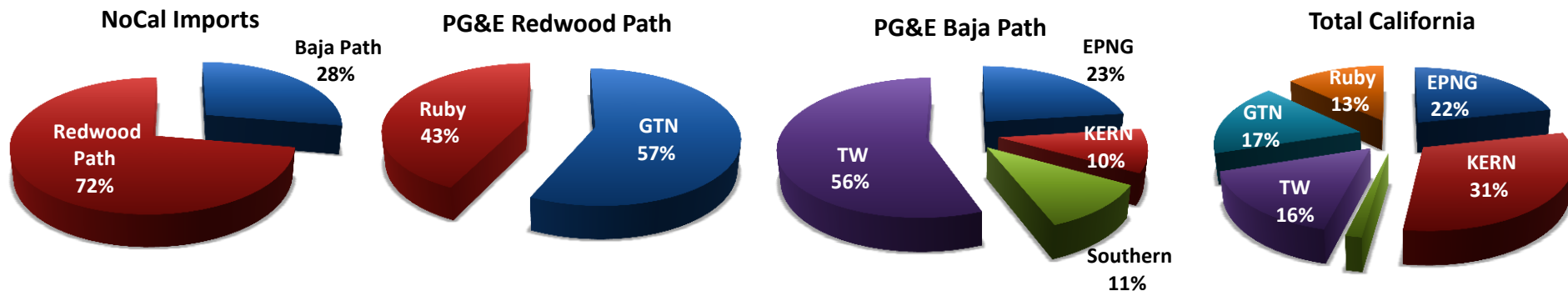
#	Province	Oil (Bbls)	Wet gas (TCF)	Dry gas (TCF)	Billion (BOE)
1	Tampico-Misantla	30.7	20.7	0	34.8
2	Burgos MZ	0	9.5	44.3	10.8
3	Burro-Picachos	0.6	6.6	11.4	4.2
4	Sabinas	0	0	49	9.8
5	Veracruz	0.6	0	0	0.6
6	Chihuahua	In study			
	<b>TOTAL</b>	<b>31.9</b>	<b>36.8</b>	<b>104.7</b>	<b>60.2</b>



# California and Desert SW Trends

# California Import Breakdown

## YoY March-2014



### Percentage Change

NoCal Imports	Mar-14	Mar-13	Change
Baja Path	28%	28%	0%
Redwood Path	72%	72%	0%

Redwood	Mar-14	Mar-13	Change
GTN	57%	49%	8%
Ruby	43%	51%	-8%

Baja	Mar-14	Mar-13	Change
EPNG	23%	30%	-7%
KERN	10%	28%	-18%
Southern	11%	6%	5%
TW	56%	36%	20%

Total California	Mar-14	Mar-13	Change
EPNG	22%	17%	5%
KERN	31%	28%	3%
Southern	2%	1%	0%
TW	16%	19%	-3%
GTN	17%	17%	0%
Ruby	13%	18%	-5%
KM Share	35%	35%	0%

### Throughput Changes (MDth/d)

NoCal Imports	Mar-14	Mar-13	Change
Baja Path	559	736	-177
Redwood Path	1,457	1,892	-434
NoCal Demand	2,016	2,628	-612

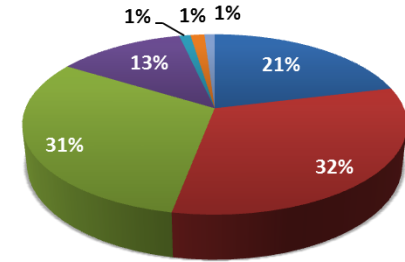
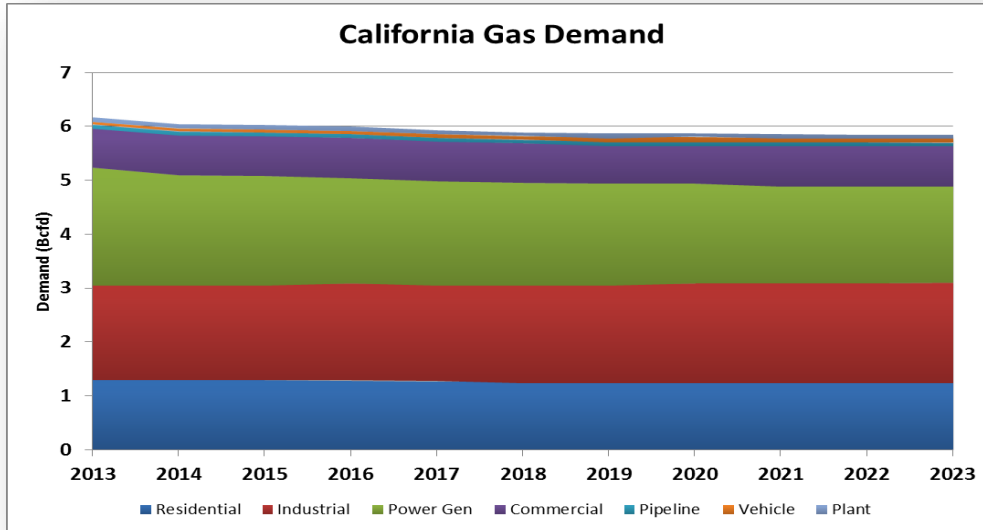
Redwood	Mar-14	Mar-13	Change
GTN	830	931	-101
Ruby	627	961	-334

Baja	Mar-14	Mar-13	Change
EPNG	128	223	-94
KERN	57	204	-147
Southern	61	41	20
TW	312	268	45

Total California	Mar-14	Mar-13	Change
EPNG	1,048	929	119
KERN	1,489	1,527	-38
Southern	74	77	-3
TW	783	1,035	-251
GTN	830	931	-101
Ruby	627	961	-334
KM Share	1,675	1,890	-215

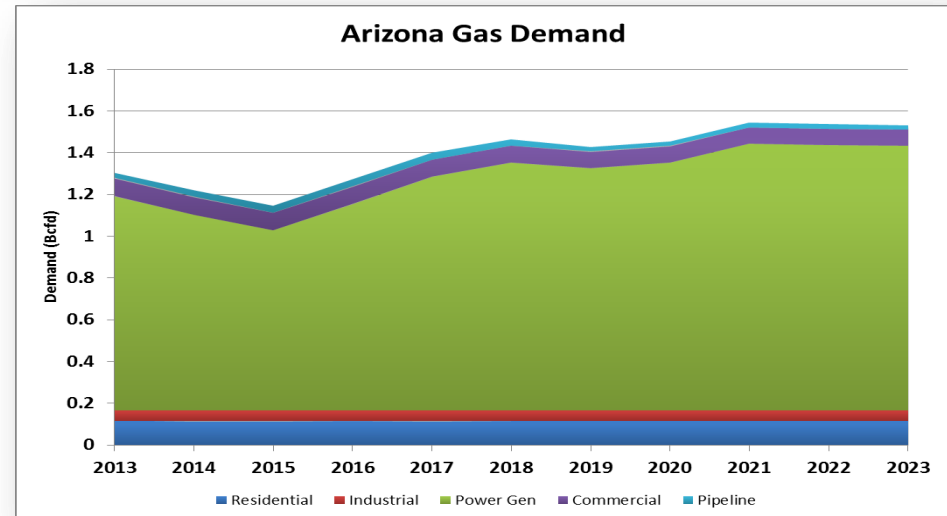
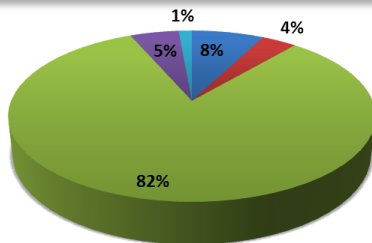
# Natural Gas Demand Forecast

## U.S. Desert SW Region



California gas demand decreases in near-term as renewables and DSM increase and is flat to slightly down thereafter

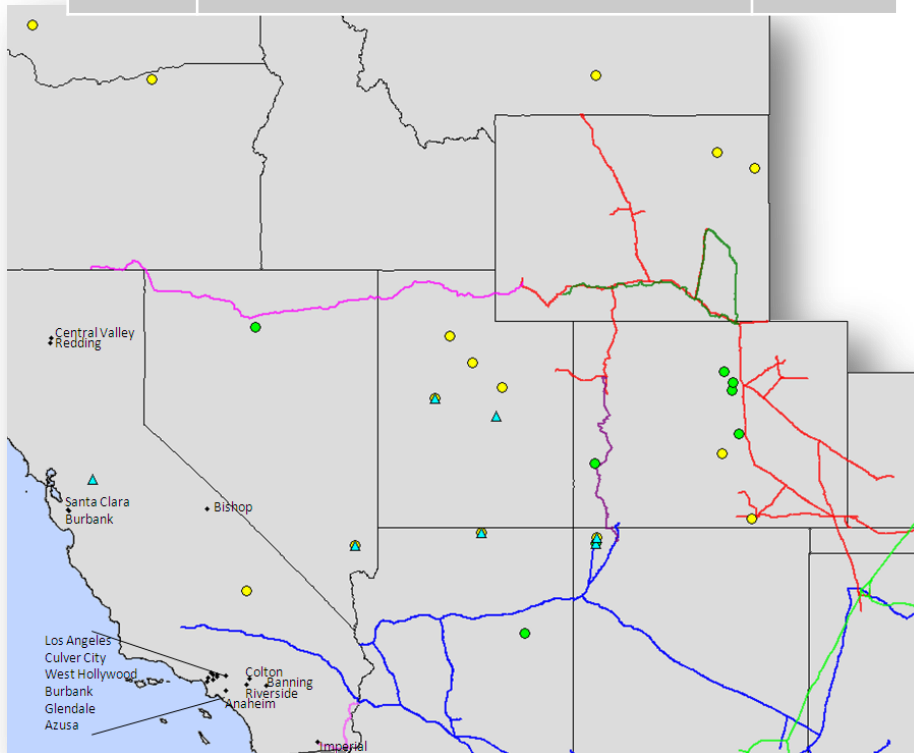
Arizona demand falls off slightly on lower power generation demand, but picks up in later years on new gas-fired generation and an improving economy



# West Region

## Power Gen Retirements & Conversions

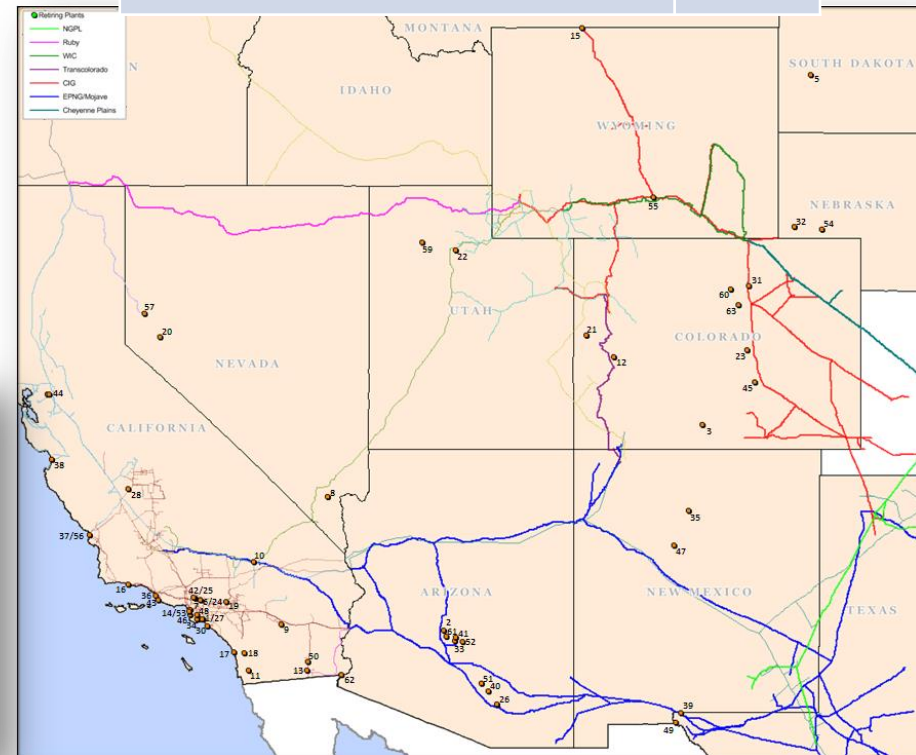
Map	Capacity Type	MW
▲	CA Coal Contracts	3,458
●	Probable Coal Retirements	3,302
●	Possible Coal Retirements	9,451



### Nuke Retirements?

Diablo Canyon (2,200 MW) NRC license expires in 2024-2025. Renewal will depend on seismic studies and once-through cooling issues.

Capacity Type	MW
Gas Fired Retirements	2,857





# Summary of Key Points

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- Once secondary legislation is available (2Q 2014), a lot will be known about critical tax reform and contract structures
- If the reform is successful, Mexico will target oil to remain a net oil exporter, and will continue to import the majority of its gas from the US ... despite significant potential reserves
  - In the long run, the question remains if tying its gas future to US shale revolution pays more than developing its own resource
- Power sector will be the first sector to show substantial improvements after the reform as Mexico continues to phase out oil use for power generation
  - Gas fueled power generation will double by 2030 ... gas demand will grow accordingly
- As Mexican exports grow they will continue to take up pipeline space; however, growth is occurring at a time when regional supply is growing and Southwest demand is declining
- If Mexico develops its shale gas resource sooner, than expect more of impact (downward pressure) on US exports in Southeast Mexico

**Thank You!**

**Questions?**

# Appendix

# PGC Regional Resource Assessment

PGC Area	Traditional Gas Resources (Mean Value, Tcf)	Traditional Proportion of Total US	Change From 2010 Report	
Atlantic	741.3	33.4%	+387.7	110%
Gulf Coast	521.0	23.4%	+15.7	3.0%
Rocky Mountain	421.3	19.0%	+77.3	22.5%
Mid-Continent	269.5	12.1%	-2.7	-1.0%
Pacific	54.4	2.5%	+0.4	0.8%
North Central	20.8	0.9%	-0.8	-3.9%
<b>Total Lower 48 U.S.*</b>	<b>2,011.4</b>		+486.4	31.5%
Alaska	193.8	8.7%	0	0%
<b>Total U.S. Traditional*</b>	<b>2,225.6</b>		+486.4	28.0%

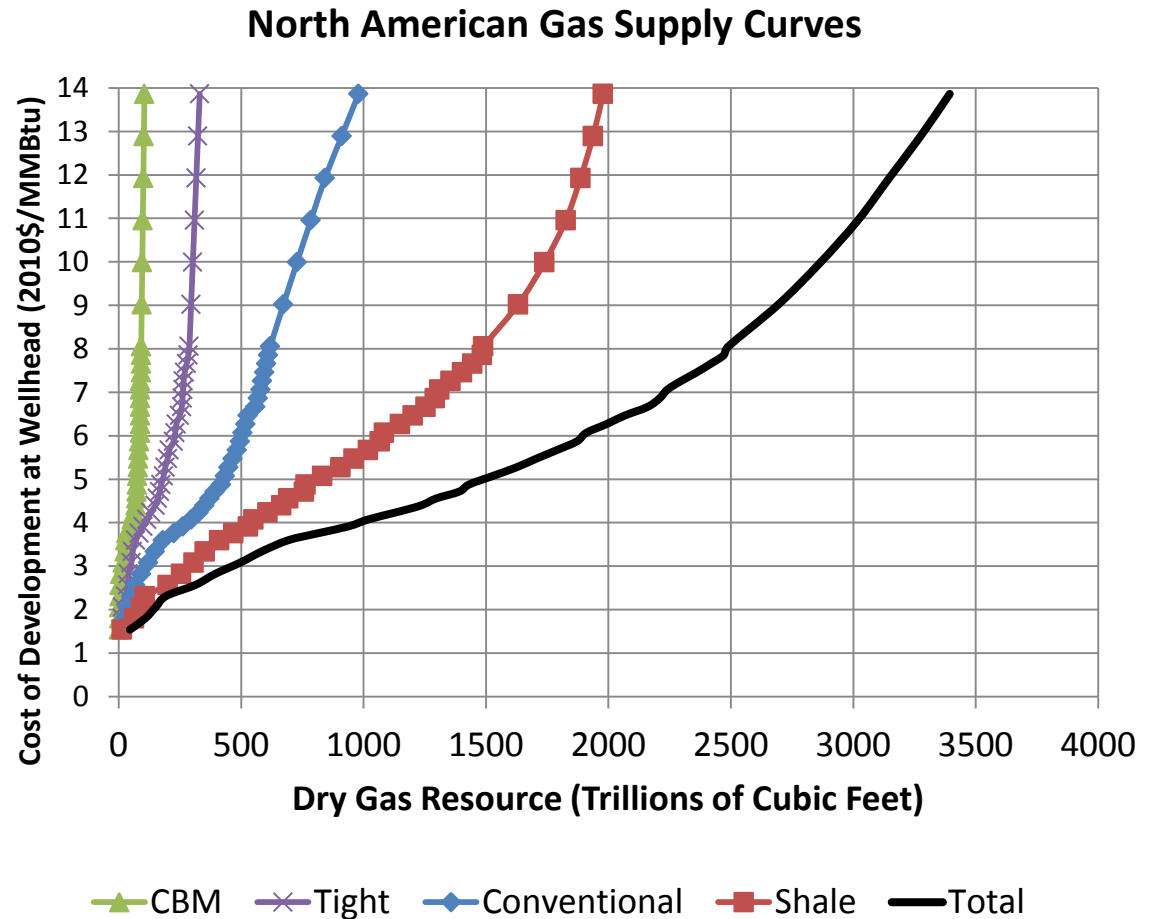
Data source: Potential Gas Committee (2013)

\* Separately aggregated total. Area means are not arithmetically additive.

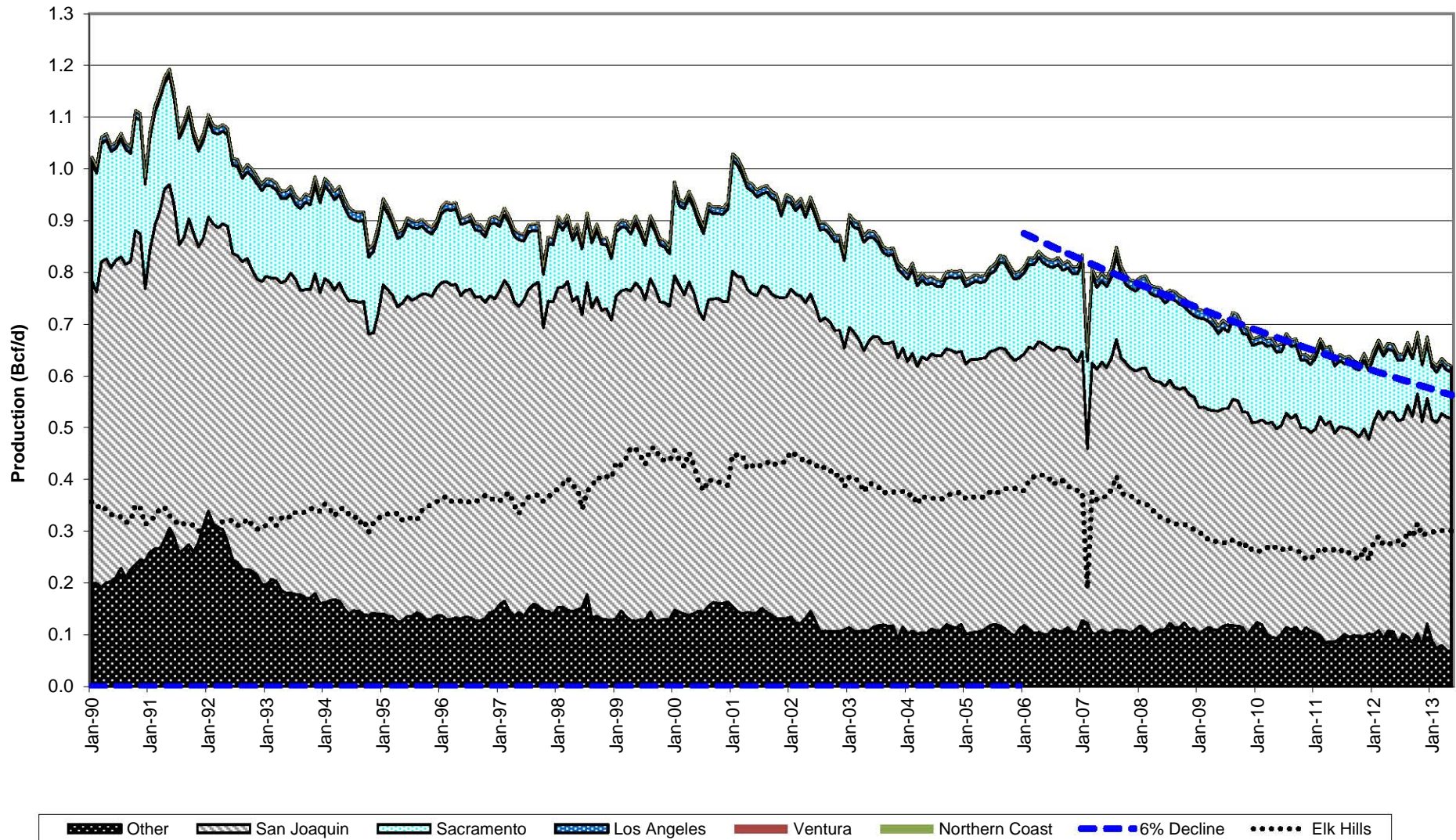
CBM not included

# North American Gas Supply Curves Show a Substantial Amount of Low-Cost Gas

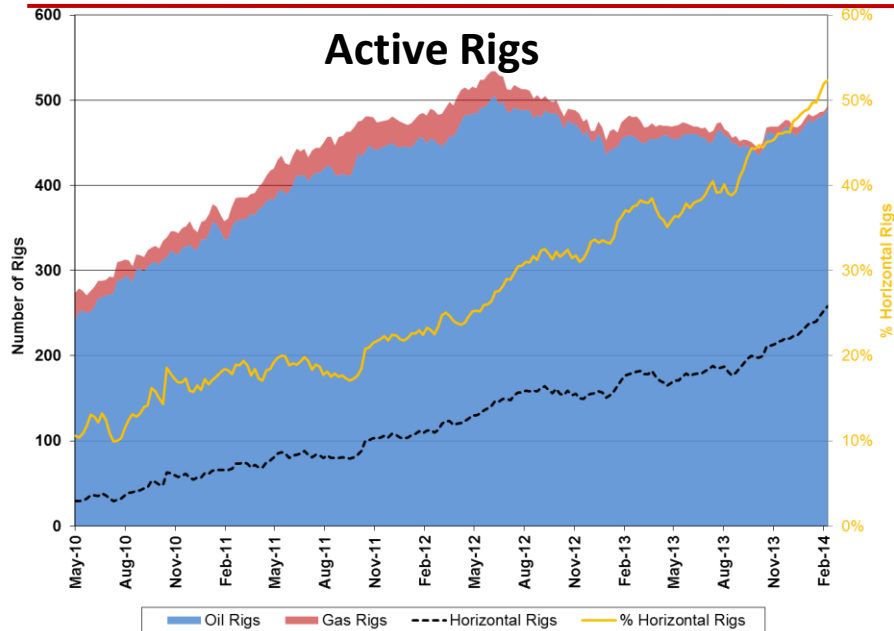
- The existing North America resource base includes about 1,500 Tcf of gas that is economically recoverable at \$5 per MMBtu.
- Shale gas accounts for over half of the gas economically recoverable at \$5 per MMBtu.
- The total cost of developing new resource as depicted in these curves includes exploration, development and O&M costs (both fixed and variable cost).



# California Gas Production

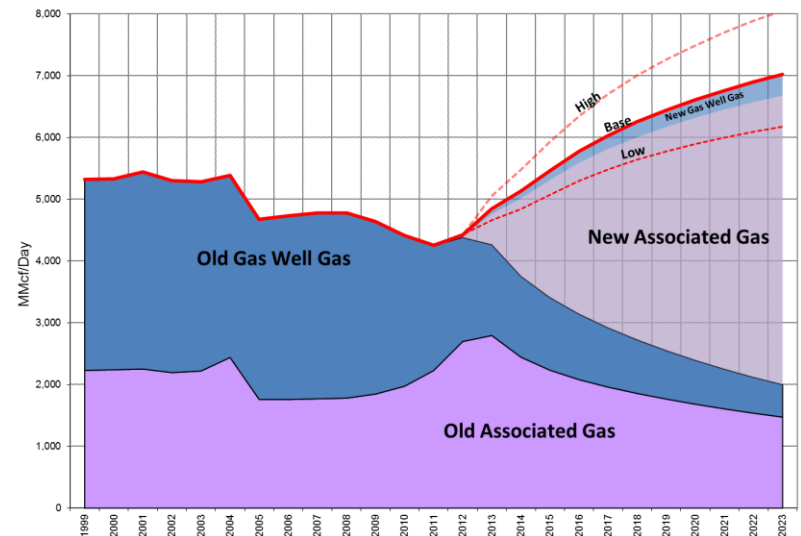


# Permian Production & Drilling Trends



- Permian basin drilling trends
  - 490 active oil rigs – 34% of US total
  - 63% oil rigs are horizontal and increasing
  - 3 gas rigs – down from 80 in 2008
- Multiple pay zones allow for application of new technology in a mature field
- \$350 billion CapEx over next decade

## Supply Forecast



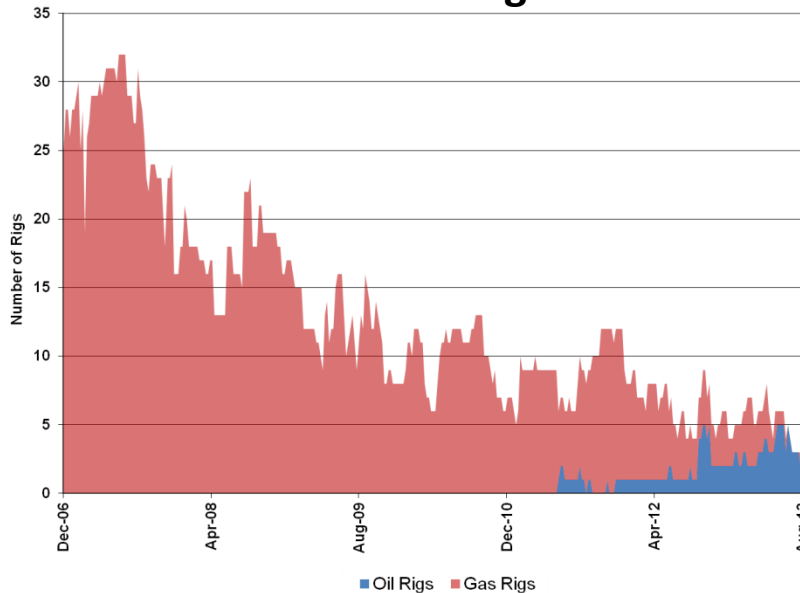
Focus on more lucrative oil production is driving associated gas gains

- Current production of 5.0 Bcf/d, with expected growth of 2.2 Bcf/d over next decade
- Associated growing from 68% to 88% over the next decade
- Gas drilling to remain weak



# San Juan Production & Drilling Trends

## Active Rigs



- Mature basin – currently producing 3.1 Bcf/d, with peak production in 1999
- Dry gas – less than 1% associated gas, but expected to grow
- Anticipate continued production declines of 1 to 3 % per year, over the next several years
- Associated gas upside of 100 to 400 MMcf/d by 2023

- Decline in gas drilling
- Recent oil drilling targeting Niobrara / Mancos shale zones
  - Horizontal drilling
  - WPX announced good results
    - 4 well avg. max rates = 728 boe/d

## Supply Forecast

